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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,280	02/26/2004	Paul Tinwell	FMO P-3856-1	5165

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JAMES D. STEVENS
REISING, ETHINGTON, BARNES, KISSELLE, P.C.
P.O. BOX 4390
TROY, MI 48099

EXAMINER	
SANTIAGO, MARICELI	
ART UNIT	**PAPER NUMBER**
2879	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/787,280	TINWELL ET AL.	
	Examiner	Art Unit	
	Mariceli Santiago	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 27-47* is/are pending in the application.

4a) Of the above claim(s) *42-47* is/are withdrawn from consideration.

5)☒ Claim(s) *33-38* is/are allowed.

6)☒ Claim(s) *1-3,5-8,11-20,27,29-31,39 and 41* is/are rejected.

7)☒ Claim(s) *4,9,10,28,32 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *20070309*.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The Amendment, filed on August 21, 2006, has been entered and acknowledged by the Examiner.

Cancellation of claims 21-26 has been entered.

Claims 1-20 and 27-47 are pending in the instant application.

Claims 42-47 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention.

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn, see attached interview summary for details.

Examiner's note

The following rejection is partially based on a foreign reference to JP 02061973 A. An official English translation of the reference has been requested and would be submitted as soon as it is available to the examiner.

Claim Objections

Claim 40 is objected to because of the following reasons:

Claim 40 recites, "includes only material from the center electrode", the use of the term "includes" is objectionable since its use is considered as an open-ended transitional phrase and the claim requires "only material from the center electrode", which exclude the use of other materials. It is suggested the use phrases such as, "consisting", "consist", "essentially consisting of", etc. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8, 11-15, 17-20, 27, 29-31, 39 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Oshima (JP 02-061973).

Regarding claim 1, Oshima discloses a noble metal tip for use with a spark plug electrode, comprising a firing end (upper end portion of tip 5) having a sparking surface, an attachment end (lower end of tip 5), and a retention feature (6) extending generally radially into the noble metal tip (5) from an exposed surface of the noble metal tip, the retention feature being located adjacent the attachment end (Fig. 2).

Regarding claim 2, Oshima discloses a noble metal tip wherein the noble metal tip has a diameter.

Regarding claim 3, Oshima discloses a noble metal tip wherein the retention feature radially extends only partially through the diameter of the noble metal tip.

Regarding claim 5, Oshima discloses a noble metal tip wherein the retention feature comprises a groove that extends around the entire circumference of the noble metal tip (Fig. 2).

Regarding claim 6, Oshima discloses a noble metal tip wherein the retention feature comprises a hole extending inwardly into the noble metal tip (Fig. 2).

Regarding claim 7, Oshima discloses a noble metal tip wherein the retention feature radially extends into the noble metal tip by a distance that is less than one half of the diameter of the noble metal tip (Fig. 2, Page 3, upper right paragraph).

Regarding claim 8, Oshima discloses a noble metal tip wherein the tip further comprises a plurality of retention features (6), and wherein one or more of the features are located at a first axial position along the tip and one or more of the features are located at a second axial position along the tip, the first and second axial positions being spaced from one another (Fig. 2).

Regarding claim 11, Oshima discloses a noble metal tip wherein the noble metal tip is comprised of an Ir-based material (Page 2, lower right paragraph).

Regarding claims 12 and 13, Oshima discloses an electrode assembly including the noble metal tip and a spark plug including the electrode assembly.

Regarding claim 14, Oshima discloses a center electrode assembly for use in a spark plug, comprising a center electrode (3) component including a front end having a blind bore (4) formed therein, a generally cylindrical noble metal tip (5) secured within the blind bore, the tip including: a firing end (upper end of tip 5) having a sparking surface, an attachment end (bottom end of tip 5) located within the blind bore, and a preformed retention feature (6), and a fusion layer (14) that extends into the preformed retention feature and locks the noble metal tip to the center electrode (Page 3, bottom left paragraph, the fusion layer is form by heating the noble metal tip and the nickel based center electrode at 1000°C to form a Pt-Ni alloy layer 14).

Regarding claim 15, Oshima discloses a center electrode assembly wherein the tip further comprises a plurality of retention features (6), and wherein one or more of the features are located at a first axial position along the tip and one or more of the features are located at a second axial position along the tip, the first and second axial positions being spaced from one another (Fig. 2).

Regarding claim 17, Oshima discloses a center electrode assembly wherein the sparking surface has a diameter between 0.25mm-1.0mm (Page 3, upper right paragraph).

Regarding claim 18, Oshima discloses a center electrode assembly wherein the noble metal tip is comprised of an Ir-based material (Page 2, lower right paragraph).

Regarding claim 19, Oshima discloses a center electrode assembly wherein the center electrode component is comprised of a nickel-based material (Page 2, upper right paragraph). In regards to the limitation "having a thermal conductivity of greater than 30 W/mK during normal spark plug operating temperatures", the thermal conductivity of a material is an intensive property of the material, accordingly, given that Oshima discloses the use of a nickel center electrode, it is considered to inherent inherently possess the property of a thermal conductivity of greater than 30 W/mK during normal spark plug operating temperatures.

Regarding claim 20, Oshima discloses a spark plug including the center electrode assembly.

Regarding claim 27, Oshima discloses a center electrode assembly wherein the retention feature radially extends only partially through the diameter of the noble metal tip.

Regarding claim 29, Oshima discloses a center electrode assembly wherein the retention feature comprises a groove that extends around the entire circumference of the noble metal tip (Fig. 2).

Regarding claim 30, Oshima discloses a center electrode assembly wherein the retention feature comprises a hole extending inwardly into the noble metal tip (Fig. 2).

Regarding claim 31, Oshima discloses a center electrode assembly wherein the retention feature radially extends into the noble metal tip by a distance that is less than one half of the diameter of the noble metal tip (Fig. 2, Page 3, upper right paragraph).

Regarding claim 39, Oshima discloses an electrode assembly for a spark plug, comprising a center electrode (3), a noble metal tip (5) having an attachment end and a firing end that includes a sparking surface, the attachment end being recessed into the center electrode, wherein the noble metal tip includes one or more preformed retention features (6) extending inwardly into the tip from a peripheral surface of the tip at a location intermediate the attachment end and the firing end, and wherein the tip is secured to the center electrode by a

fusion layer (14) that extends into the one or more preformed retention features (Page 3, bottom left paragraph, the fusion layer is form by heating the noble metal tip and the nickel based center electrode at 1000°C to form a Pt-Ni alloy layer 14).

Regarding claim 41, Oshima discloses an electrode assembly wherein the tip is attached to the center electrode by the fusion layer, whereby the fusion layer includes material from both the tip and the center electrode (Page 3, bottom left paragraph, the fusion layer is form by heating the noble metal tip and the nickel based center electrode at 1000°C to form a Pt-Ni alloy layer 14). In regards to the limitation "the tip is welded to the center electrode", in view of an absent of a showing that the method imparts distinctive structural characteristics to the final product, the limitations directed to the method of manufacturing are not germane to the issue of patentability of the device.

Claims 1-3, 7 and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Shibata et al. (US 5,982,080).

Regarding claim 1, Shibata discloses a noble metal tip for use with a spark plug electrode, comprising a firing end (upper end portion of tip 5) having a sparking surface, an attachment end (lower end of tip 5), and a retention feature (fused portion 7) extending generally radially into the noble metal tip (Fig. 1A, Column 8, lines 14-17) from an exposed[1] surface (surface is exposed to a laser welding process, by which the fused portion 7 extending into the metal tip is created) of the noble metal tip, the retention feature being located adjacent the attachment end (Fig. 2).

Regarding claim 2, Shibata discloses a noble metal tip wherein the noble metal tip has a diameter (Fig. 1B).

[1] to subject, as to the action of something

Regarding claim 3, Shibata discloses a noble metal tip wherein the retention feature radially extends only partially through the diameter of the noble metal tip (Fig. 1B).

Regarding claim 7, Shibata discloses a noble metal tip wherein the retention feature radially extends into the noble metal tip by a distance that is less than one half of the diameter of the noble metal tip (Lp, Fig. 1A).

Regarding claim 11, Shibata discloses a noble metal tip wherein the noble metal tip is comprised of an Ir-based material (Column 5, line 6).

Regarding claims 12 and 13, Shibata discloses an electrode assembly including the noble metal tip and a spark plug including the electrode assembly (Fig. 1A).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima (JP 02-061973) in view of Kanao et al. (EP 1139530 A2).

Regarding claim 16, Oshima fails to exemplify the limitation of the sparking surface protrudes beyond the end of the center electrode front end by a distance between 0.1mm-1.0mm. In the same field of endeavor, Kanao discloses a spank plug assembly wherein the sparking surface protrudes beyond the end of the center electrode front by a distance equal to of greater that 0.3 mm, since provision of a too short protruding distance can cause a spark discharge at an unpredictable point on the central electrode surface, which may cause that surface to be overly exhausted and allow the firing tip to fall out. Thus, it would have been

obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the protruding distance of the sparking surface within the claimed value range as disclosed by Kanao in the electrode assembly of Oshima in order to prevent undesirable discharges outside the sparking surface, thus preventing failure of the tip.

Allowable Subject Matter

Claims 33-38 are allowed over the prior art of record.

Claims 4, 9-10, 28, 32 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 4 and 28, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claims 4 and 28, and specifically comprising the limitation of the retention feature is of a generally conical shape.

Regarding claims 9-10 and 32, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claims 9-10 and 32, and specifically comprising the limitation of comprising a plurality of the retention features, wherein first and second retention features are located at a first axial position and are circumferentially spaced from one another by approximately 180°, and third and fourth retention features are located at a second axial position and are circumferentially spaced from one another by approximately 180°.

Regarding claim 33, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 33, and specifically comprising the limitation of the tip is locked to the electrode by material that: i) includes electrode material without any significant amount of noble metal material, ii) extends into the one or more recessed retention features, and iii) conforms with the shape of the one or more recessed retention features.

Regarding claims 34-38, claims 34-38 are allowable for the reasons given in claim 33 because of their dependency status from claim 33.

Regarding claim 40, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 40, and specifically comprising the limitation of the fusion layer consist of only material from the center electrode, whereby the tip is locked to the center electrode.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-8, 11-15, 17-20, 27, 29-31, 39 and 41 have been considered but are moot in view of the new grounds of rejection based on Oshima (JP 02-061973).

Applicant's arguments, see remarks, filed August 21, 2006, with respect to the objection of claim 8, 9 and 32 have been fully considered and are persuasive. The objection of claims 8,9 and 32 has been withdrawn.

Applicant's arguments filed August 21, 2006, in regards to the rejection of claims 1-3, 7 and 11-13 under 35 U.S.C. 102(b) as being anticipated by Shibata et al. (US 5,982,080), have been fully considered but they are not persuasive.

Applicant contends that the prior art of record to Shibata fails to teach the limitations of "a retention feature that extends generally radially into a noble metal tip from *an exposed surface of the noble metal tip*", the argument is not found persuasive since it is considered that Shibata exemplifies a retention feature extending generally radial into a noble metal tip from a peripheral surface of the noble metal tip. The recitation of "an exposed surface" is considered to be met by Shibata's disclosure of exposing the surface to a heating treatment, since the term "exposed" is considered to imply "to subject, as to the action of something". Accordingly, claims

1-3, 7 and 11-13 stand rejected under 35 U.S.C. 102(b) as being anticipated by Shibata et al. (US 5,982,080).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (571) 272-2464. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mariceli Santiago
Primary Examiner
Art Unit 2879